

# ***Static Electricity***

(A revised version of an activity included in the Educator’s Guide from the NASA SciFiles™ program “The Case of the Electrical Mystery.” Used by permission.)

**Organizing Topic** Investigating Electricity

**Overview** Students investigate the properties of static electricity.

**Related Standards of Learning** 4.3c

## **Objectives**

The students should be able to

- explain how static electricity is created and occurs in nature;
- design an investigation using static electricity to attract or repel a variety of materials.

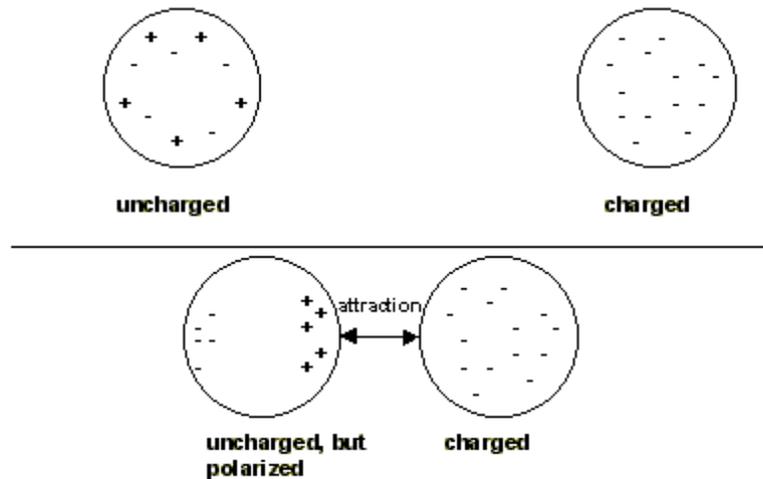
## **Materials needed**

- Attached activity sheets
- Transparent tape
- Comb
- Balloon
- Access to water from a faucet
- Science journal

## **Instructional activity**

### ***Content/Teacher Notes***

Static electricity exists whenever there are unequal amounts of positively and negatively charged particles present. Rubbing a balloon or comb on your hair makes the balloon or comb have more of one type of charge. The rubbing transfers electrons from you to the balloon’s surface and gives the balloon a negative charge. As you bring the balloon near an object, the balloon induces a positive charge on the object because opposite charges attract. When the object and the balloon touch, electrons flow from the balloon to the object, giving the object a negative charge. Now that the balloon and the object both have the same charge, they repel each other.



Static electricity is not caused by friction. It appears when two unlike materials make contact and then are separated. All that is required is the actual touching of the two materials. Rubbing will increase the total contact area between the materials and this will, in turn, make the materials more electrically dissimilar. Rubbing enhances static electricity, but it is not the cause.

### ***Introduction***

1. Access “The Case of the Electrical Mystery” (see Resources below), and review the educator’s guide related to this episode.
2. Have students complete the activity on the attached activity sheet “Dr. D’s Lab Experiments,” and then hold a class discussion about the results.
3. After the discussion, have students watch “The Case of the Electrical Mystery.” Lead the discussion into the ideas of attracting and repelling.

### ***Procedure***

1. Have students complete the activity on the attached activity sheet “Cling On,” following the directions given on the sheet.

### ***Observations and Conclusions***

1. After students complete the activity and the concluding questions, review them with the class.

### **Sample assessment**

- Assess student journals.
- Have students explain how static electricity exists.

### **Follow-up/extension**

- Place some plastic drinking straws on a table. Charge a plastic pen with static electricity by rubbing it with a wool cloth. Place the pen close to the straws. Ask students to describe what happens and why.

- Have students try a variety of hairbrushes and combs made out of different materials like plastic, wood, or metal. Does your hair behave differently with each? Which one would give you a “bad hair day”?
- Brainstorm for ideas about how static electricity is produced in nature. Does weather make a difference?

## Resources

- “The Case of the Electrical Mystery.” *NASA SciFiles™*. <http://scifiles.larc.nasa.gov/educators/index.html>. Click “Episodes” and “2001–2002 Season.”
- *Connections: Connecting Books to the Virginia SOLs*. Fairfax County Public Schools and The College of William and Mary. <http://www.fcps.edu/cpsapps/connections>. Presents a database of more than 1,000 works of children’s literature and their connection to the Virginia Standards of Learning.
- *Outstanding Science Trade Books for Students K–12*. National Science Teachers Association (NSTA). <http://www.nsta.org/ostbc>.
- *Search for Literature: Literature for Science and Mathematics*. California Department of Education. <http://www.cde.ca.gov/ci/sc/ll/ap/searchlist.asp>. Offers a searchable database.